



## Fact Sheet

Aquifer Protection Permit #P-105324  
Place ID #18583, LTF #37771  
Johnson Utilities, LLC  
Pecan Water Reclamation Plant  
Significant Amendment

The Arizona Department of Environmental Quality (ADEQ) proposes to issue an aquifer protection permit for the subject facility that covers the life of the facility, including operational, closure, and post-closure periods unless suspended or revoked pursuant to A.A.C. R18-9-A213. This document gives pertinent information concerning the issuance of the permit. The requirements contained in this permit will allow the permittee to comply with the two key requirements of the Aquifer Protection Program: 1) meet Aquifer Water Quality Standards at the Point of Compliance; and 2) demonstrate Best Available Demonstrated Control Technology (BADCT). The purpose of BADCT is to employ engineering controls, processes, operating methods or other alternatives, including site-specific characteristics (i.e., local subsurface geology) to reduce discharge of pollutants to the greatest degree achievable before they reach the aquifer, or to keep pollutants from reaching the aquifer.

### I. FACILITY INFORMATION

#### Name and Location

|                             |   |
|-----------------------------|---|
| Name of Permittee           | Johnson Utilities, LLC  |
| Mailing Address:            | 5230 East Shea Blvd., Suite 200<br>Scottsdale, Arizona 85254                                      |
| Facility Name and Location: | Pecan Water Reclamation Plant<br>38539 North Gantzel Road<br>Queen Creek, Arizona, (Pinal County) |

#### Regulatory Status

4/1/03 APP Permit Application; APP Permit issued on May 7, 2004

The facility was issued an individual Aquifer Protection Permit (APP) on May 7, 2004, for operation of the Phase 1 facility with a design flow of 0.999,998 MGD. All effluent was proposed to meet Reclaimed Water Class A+ and was proposed to be consumptively reused on the Links Estates Golf Course, the Apache Sun Golf Course and a grove of pecan trees adjacent to the WRP. However, this permit limited the effluent discharge flow to 0.475 MGD because the facility was unable to show that they had sufficient disposal capacity for all Phase 1 effluent at the approved golf courses including a minimum of 5-day effluent storage capacity (in the event that effluent cannot be reused consumptively) within the golf course lakes. The permit included a compliance schedule that required the facility submit documentation that they had sufficient disposal capacity for the design flow of 0.999,998 MGD.

Type 2 Class A+ Reclaimed Water General Permit, Inventory #R105491; Issued on May 21, 2004

The permit authorized the use of Class A+ reclaimed water derived from the Pecan WRP on a pecan orchard consisting of approximately 8.5 acres and 312 trees located adjacent to the Pecan WRP. During the winter months, the site may be over-seeded with rye grass for grazing purposes. This permit was inactivated with issuance of a Type 3 Class A+ Reclaimed Water General Permit, Inventory #R105412 issued on July 19, 2006.

7/6/04 Significant Amendment Application; withdrawn on February 8, 2005

A significant amendment request was received on July 6, 2004. This amendment indicated that the permittee will be constructing two 0.5 MGD recharge basins on the site designated for future expansion of the WRP. The application also requested re-classification of effluent from Reclaimed Water Class A+ to Reclaimed Water Class B+. This application was deemed incomplete and a letter was sent to the permittee on August 31, 2004, requesting additional information. A response was received to this request for additional information on December 1, 2004, which included an additional amendment application. This application was withdrawn on February 8, 2004, and incorporated into the November 29, 2004, Significant Amendment application.

11/29/04 Significant Amendment Application; Amendment issued on June 1, 2005

A second significant amendment request was received on November 29, 2004. The amendment proposed to expand the WRP to 4.0 MGD and dispose of effluent from the first 1 MGD via two on-site recharge basins and all 4.0 MGD, in the future, via up to 4 recharge wells and/or 12 vadose zone wells.

The second significant amendment application was found to be administratively complete on January 31, 2005. By default the first significant amendment was also determined to be administratively complete on January 31, 2005, since the amendment request had been incorporated into the second amendment. The permit was amended on June 1, 2005. The permit allowed Reclaimed Class B+ for reuse but required large facility BADCT for pathogen reduction of non-detect and 23 cfu/100ml.

ADWR Recharge Permit Applications dated June 20, 2005:

Applications for an Underground Storage Facility (USF) and a Water Storage Facility signed on June 20, 2005, were submitted to ADWR. The USF is proposed to be comprised of 12 vadose zone recharge wells, 1 monitor well and 4 contingency injection wells designed to recharge Class B+ effluent. Up to 4480 acre-feet of effluent per year will be recharged with a maximum recharge volume of 89,600 acre-feet to be stored over the 20-year duration of the permits. The mounding analysis projected a 54-foot mound height after 20-years of recharge. The maximum area of impact (AOI) of the 1-foot water level rise was calculated to extend

approximately 11-miles from the center of the recharge site which was modeled as a point source. These applications are still in process at ADWR.

09/06/2005 AZPDES Permit Application

An AZPDES application was received on September 6, 2005, proposing to add a surface water discharge point to Queen Creek. This application was amended on June 12, 2006, changing the proposed effluent discharge method from a surface discharge to a subsurface leach disposal field located beneath the active stream channel of Queen Creek due to Pinal County requirements. The subsurface leach disposal field was also determined to need an AZPDES permit.

09/26/05 Significant Amendment Application

A significant amendment application was received on was September 26, 2005, proposing to add a surface water discharge of effluent to Queen Creek with a valid AZPDES permit. This application was re-submitted on June 12, 2006, changing the proposed effluent discharge method to a subsurface leach disposal field located within the active channel of Queen Creek. This subsurface recharge facility is proposed to be constructed in four phases and is designed to dispose, at build-out, between 0.18 MGD (ADEQ Engineering calculations) and 4 MGD (Specific Engineering calculations). The built-out constructed subsurface recharge facility will be approximately one mile long and 120 feet wide.

Type 3 Agent Class B+ Reclaimed Water General Permit, Inventory #105412; Issued on July 19, 2006.

The Type 3 Class B+ Reclaimed Water General Permit, Inventory #R105412 was originally issued on October 1, 2003, to use reclaimed water derived from the Section 11 Wastewater Treatment Plant (WWTP), Inv. #103081, at the Oasis Golf Course. This permit was amended on July 19, 2006, to include effluent derived from the Pecan WRP (Inv. #105324) and Precision Golf Course WRP (Inv. #105004). The effluent was originally proposed to be used at the Oasis Golf Course, Anthem at Merrill Ranch Golf Course, Pecan South subdivision, Pecan orchard adjacent to the Pecan WRP, Johnson Farms subdivision, and Precision Golf Course. Additional reclaimed water sites could be added based on supplemental documentation to be submitted annually. This permit is effective for five years and expires, unless inactivated on July 19, 2011.

08/26/2006 Other Amendment Application; Amendment Issued on 11/20/06

An Other Amendment was received on August 26, 2006, to change the reclaimed water classification from B+ to A+. This amendment was issued on November 20, 2006.

Type 3 Agent Class A+ Reclaimed Water General Permit, Inventory #105778; Issued on November 27, 2006.

The Type 3 Class B+ Reclaimed Water General Permit, Inventory #R105412 was originally issued on July 19, 2006, to use reclaimed water derived from the San Tan WRP (Inv. #103081) and Anthem at Merrill Ranch WRP (Inv. #105646) at various sites. The Type 3 Class A+ Reclaimed Water General Permit, Inventory #R105778 was issued to use reclaimed water derived from the San Tan WRP (Inv. #105325), Pecan WRP (Inv. #105324) and Anthem at Merrill Ranch WRP (Inv. #105646) at the following sites: Johnson Ranch Golf Course, San Tan HOA, Pecan South subdivision, Pecan orchard adjacent to the Pecan WRP, Johnson Farms subdivision, Anthem at Merrill Ranch Golf Course, and Anthem at Merrill Ranch HOA. Additional reclaimed water sites could be added based on supplemental documentation to be submitted annually. This permit is effective for five years and expires, unless inactivated on November 27, 2011.

WRP components, recharge facilities, and wells

The following tables identify the WRP components, recharge facilities and proposed wells for the facility.

Table of WRP Components

| Component                                       | Latitude        | Longitude        | Component Material | Component Thickness | Cover Material | Cover Thickness |
|---|-----------------|------------------|--------------------|---------------------|----------------|-----------------|
| Center of Facility at build-out                 | 33°13'48.198"N  | 111°33'44.630"W  |                    |                     |                |                 |
| Center of Phase I Facility                      |                 |                  |                    |                     |                |                 |
| Center of Phase II Facility                     |                 |                  |                    |                     |                |                 |
| Center of Phase III Facility                    |                 |                  |                    |                     |                |                 |
| Center of Phase IV Facility                     |                 |                  |                    |                     |                |                 |
| Effluent Pump Station (effluent sampling point) | 33°13'47.671" N | 111°33'43.778" W |                    |                     |                |                 |
| AZPDES Outfall                                  | 33°13'51.106" N | 111°33'42.686" W |                    |                     |                |                 |

Conceptual/actual pond designs:

| Pond Type                         | Recharge Pond #1 | Recharge Pond #2 |
|-----------------------------------|------------------|------------------|
| Descriptive Location              | North Pond       | South Pond       |
| Latitude                          | 33°13'47.574" N  | 33°13'46.280" N  |
| Longitude                         | 111°33'42.670" W | 111°33'42.470" W |
| Storage Volume (gallons)          |                  |                  |
| Storage Volume (ft <sup>3</sup> ) |                  |                  |

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|                                 |  |         |
|---------------------------------|--|---------|
| <b>Length (feet)</b>            | 142  | 142     |
| <b>Width (feet)</b>             | 127.5  | 127.5   |
| <b>Total Depth (feet)</b>       | 7  | 7       |
| <b>Operational Depth (feet)</b> | 5  | 5       |
| <b>Freeboard (feet)</b>         | 2  | 2       |
| <b>Liner Material</b>           | unlined  | unlined |
|                                 | Discharge to recharge basins ceased June 24, 2005, with construction of Phase II of the WRP. Phase II of the WRP began operation on July 25, 2006. |         |

**Actual and Conceptual Well Designs**

| <b>Well Type</b>                              | <b>On-site Production Well</b> | <b>Monitor Wells</b>      | <b>Vadose Zone Wells</b>   | <b>Direct Injection Wells</b> | <b>BADCT Observation Wells</b>                                   |
|---|--------------------------------|---------------------------|----------------------------|-------------------------------|--|
| <b>Cadastral</b>                              | D(2-8) 29bcb                   | To be determined (TBD)    | TBD                        | TBD                           | TBD  |
| <b>ADWR Registration ID #</b>                 | 55-599386                      | TBD                       | TBD                        | TBD                           | Not applicable (N/A)   |
| <b>Date Completed</b>                         | 8/14/03                        | TBD                       | TBD                        | TBD                           | TBD  |
| <b>Boring Depth (feet) and width (inches)</b> | 0-20': 10"<br>20-560': 8"      | 0-20': 12"<br>20-400': 7" | 0-80': 48"<br>80-180': 30" | 0-600': 30"                   | minimum 3': 4"   |
| <b>Completed Well Depth (feet)</b>            | 560                            | 400                       | 180                        | 600                           | minimum 3': 4"   |
| <b>Well Diameter (inches)</b>                 | 6.625                          | 4                         | 12                         | 30                            | 4  |
| <b>Casing Material</b>                        | steel                          | PVC                       | PVC                        | steel                         | PVC  |
| <b>Casing Depth (feet)</b>                    | +18" – 560'                    | +18" – 400'               | +18" – 180'                | +18" – 600'                   | minimum 3  |
| <b>Casing Width (inches)</b>                  | 6.625                          | 4                         | 12                         | 18                            | 4"   |
| <b>Perforated Interval (feet)</b>             |                                | 340 -400                  | 80-180                     | 400 - 600                     | 10" , extending from perforated leach pipe to top of gravel fill |
| <b>Surface Elevation (feet amsl)</b>          |                                | TBD                       | TBD                        | TBD                           | TBD  |
| <b>Depth to Groundwater (feet amsl)</b>       | 358 (8/20/03)                  | ~358 (8/20/03)            | ~358 (8/20/03)             | ~358 (8/20/03)                | N/A  |

| Well Type                               | On-site<br>Production Well | Monitor Wells | Vadose<br>Zone Wells | Direct<br>Injection<br>Wells | BADCT<br>Observation<br>Wells               |
|---|----------------------------|---------------|----------------------|------------------------------|---|
| Groundwater<br>Elevation<br>(feet amsl) |                            |               |                      |                              | TBD after<br>installation of<br>leach field |

### **Facility Description**

The Pecan Water Reclamation Plant (WRP) has the capacity to collect and treat a maximum average monthly flow of 4.0 million gallons per day (MGD). The WRP will be constructed in four phases. Each phase is designed to treat 1.0 MGD. The 4.0 MGD of raw wastewater enters the influent lift station, and is pumped to the headworks with barscreen, where it is diverted to each of the four treatment trains. Each treatment train process consists of extended aeration with nitrification-denitrification, clarifiers, filters, ultraviolet (UV) disinfection, sludge digesters, sludge dewatering belt filter press, and an effluent pump station. The facility has stand-by chemical feed capability, and chlorine disinfection may be used as a back-up. All the WRP units are constructed of either reinforced concrete or steel. All the odor and noise producing units which include the influent pump station, headworks, the extended aeration process including the blower room, and the sludge dewatering belt filter press are enclosed inside a building with odor control scrubbers installed on all vents. The entire WRP is surrounded by an aesthetic, 6 foot tall, chain link or concrete block wall fence. All the effluent generated may be disposed by either recharge in temporary recharge basins, recharged using vadose zone wells or direct injection or reused as regulated under valid Reclaimed Water Permits. No discharge is authorized to any recharge basins. The sludge, including the screenings, grit, and scum, is hauled off site for disposal at a landfill. The WRP will produce reclaimed water meeting Class A+ Reclaimed Water Standards (A.A.C. R18-11, Article 3) and may be delivered for beneficial use under a valid reclaimed water permit under A.A.C. R18-9, Article 7.

All industrial hookups and other non-residential hookups to the treatment system shall conform to Section 307 of the Federal Water Pollution Control Act and shall be authorized according to the federal pretreatment program, or as otherwise approved by federal, state or local regulations.

In addition to the APP conditions pertaining to treatment and disposal of sewage sludge, the permittee must also comply with the requirements for any sewage sludge disposal in 40 Code of Federal Regulations (CFR) Part 503 and 18 A.A.C. Ch. 9, Art. 10.

The site includes the following permitted discharging facilities:

| Well ID              | Descriptive Location             | Latitude <sup>1</sup> | Longitude <sup>Error!</sup><br>Bookmark not defined. |
|----------------------|----------------------------------|-----------------------|--|
| POC # 1 <sup>2</sup> | northwest corner of the WRP site | 33°13'49.585" N       | 111°33'46.160" W                                     |

<sup>1</sup> Estimated locations; actual location required to be identified upon installation.

<sup>2</sup> Monitor well required to be installed as contingency action only.

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| <b>Well ID</b>                | <b>Descriptive Location</b>   | <b>Latitude<sup>1</sup></b> | <b>Longitude<sup>Error!</sup></b><br>Bookmark not defined. |
|-------------------------------|---|-----------------------------|--|
| <del>POC #2<sup>3</sup></del> | on-site production well 55-599386   | 33°13'49.829" N             | 111°33'42.954" W   |
| POC #2 <sup>4</sup>           | downstream of AZPDES outfall for the subsurface recharge facility                           | 33°13'51.059" N             | 111°33'46.121" W   |
| Aquifer Injection Well #1     | NE corner of Pecan Orchard  | 33°13'49.993" N             | 111°33'38.902" W   |
| Aquifer InjectionWell #2      | SE corner of Pecan Orchard  | 33°13'43.316" N             | 111°33'38.998" W   |
| Aquifer InjectionWell #3      | SW corner of Pecan Orchard  | 33°13'43.316" N             | 111°33'38.835" W   |
| Aquifer InjectionWell #4      | ~400' West of the NW corner of WRP site   | 33°13'49.141" N             | 111°33'50.706" W   |
| Vadose Zone Recharge Well #1  | ~50' east of Phase II WRP   | 33°13'47.365" N             | 111°33'42.451" W   |
| WRP                           | Center of WRP   | 33°13'48.198"N              | 111°33'44.630"W  |
|                               |   |                             |  |
| AZPDES Outfall                | AZPDES Outfall  | 33°13'51.106" N             | 111°33'42.686" W   |
| Vadose Zone Recharge Well #2  | ~50 east of Phase IV WRP  | 33°13'48.750" N             | 111°33'42.451" W   |
| Vadose Zone Recharge Well #3  | ~100' east of the NE corner of their along the northern boundary of the Pecan Orchard       | 33°13'49.829" N             | 111°33'41.458" W   |
| Vadose Zone Recharge Well #4  | ~200' east of the NE corner of their along the northern boundary of the Pecan Orchard       | 33°13'49.904" N             | 111°33'40.201" W   |
| Vadose Zone Recharge Well #5  | ~150' south of the NE corner of the Pecan Orchard along the eastern boundary of the Orchard | 33°13'48.750" N             | 111°33'38.998" W   |
| Vadose Zone Recharge Well #6  | ~300' south of the NE corner of the Pecan Orchard along the eastern boundary of the Orchard | 33°13'47.365" N             | 111°33'38.998" W   |
| Vadose Zone Recharge Well #7  | ~450' south of the NE corner of the Pecan Orchard along the eastern boundary of the Orchard | 33°13'45.980" N             | 111°33'38.998" W   |
| Vadose Zone Recharge Well #8  | ~600' south of the NE corner of the Pecan Orchard along the eastern boundary of the Orchard | 33°13'44.559" N             | 111°33'38.998" W   |
| Vadose Zone Recharge Well #9  | ~150' west of the SE corner of the Pecan Orchard along the southern boundary of the Orchard | 33°13'43.316" N             | 111°33'40.087" W   |
| Vadose Zone Recharge Well #10 | ~300' west of the SE corner of the Pecan Orchard along the southern boundary of the Orchard | 33°13'43.316" N             | 111°33'41.512" W   |
| Vadose Zone Recharge Well #11 | ~450' west of the SE corner of the Pecan Orchard along the southern boundary of the Orchard | 33°13'43.316" N             | 111°33'43.146" W   |
| Vadose Zone Recharge Well #12 | ~600' west of the SE corner of the Pecan Orchard along the southern boundary of the Orchard | 33°13'43.316" N             | 111°33'44.571" W   |

<sup>3</sup> Conversion of existing on-site well to monitor well required by 6/1/05 Significant Amendment. However, well has not been converted and is no longer proposed to be listed as POC in the current amendment.

<sup>4</sup> Monitor well required to be installed within 30 days of permit issuance.

| <b>Well ID</b>                  | <b>Descriptive Location</b>   | <b>Latitude<sup>1</sup></b> | <b>Longitude<sup>Error!</sup></b><br>Bookmark not defined. |
|---------------------------------|---|-----------------------------|--|
| BADCT<br>Observation<br>Well 1A | in Queen Creek; ~150' north of the NE corner of the WRP site; downstream end of Phase I disposal field. | 33°13'54.546" N             | 111°33'38.835" W   |
| BADCT<br>Observation<br>Well 1B |   | 33°13'54.348" N             | 111°33'38.821" W   |
| BADCT<br>Observation<br>Well 1C |   | 33°13'54.151" N             | 111°33'38.806" W   |
| BADCT<br>Observation<br>Well 1D |   | 33°13'53.953" N             | 111°33'38.792" W   |
| BADCT<br>Observation<br>Well 1E |   | 33°13'53.756" N             | 111°33'38.777" W   |
| BADCT<br>Observation<br>Well 1F |   | 33°13'53.558" N             | 111°33'38.763" W   |
| BADCT<br>Observation<br>Well 2  | ~0.25 miles east of BADCT Observation Well 1  | 33°13'55.232" N             | 111°33'25.831" W   |
| BADCT<br>Observation<br>Well 3  | ~0.25 miles east of BADCT Observation Well 2  | 33°13'56.578" N             | 111°33'12.916" W   |
| BADCT<br>Observation<br>Well 4  | ~0.25 miles east of BADCT Observation Well 3  | 33°13'58.320" N             | 111°33'00.064" W   |

### **Amendment Description**

Section 2.1 - Facility/Site Description: Add language describing the authorization to discharge via subsurface under the Queen Creek wash.

Section 2.4 – Change the location of the point of compliance (POC) well.

Section 2.6.1.1. Added monitoring for fissures

Section 3.0 - Compliance Schedule: Added compliance schedule for constructing and operating the subsurface system. Also added a time frame to complete the construction of a well at POC # 2.

Section 4.0 - Tables of Monitoring Requirements. Added language in Table III to allow the water level monitoring of the observation wells located downstream of the leach lines, and for reporting information when flooding of Queen Creek occurs.

Section 5.0 - References and Pertinent Information: Added the application date of the ‘other’ permit amendment, and added the issue dates for the original APP, the significant amendment, and the ‘other’ amendment.



In addition, the permit format has been updated to reflect non-substantive changes made to the format since the last permit amendment.

## II. BEST AVAILABLE DEMONSTRATED CONTROL TECHNOLOGY (BADCT)

The WRP treatment process consists of an influent lift station, headworks with barscreen, extended aeration with nitrification-denitrification, clarifiers, filters, ultraviolet (UV) disinfection, sludge digesters, sludge dewatering belt filter press, and an effluent pump station.

All the odor and noise producing units which include the headworks, the extended aeration process including the blower room, and the sludge dewatering belt filter press are enclosed inside a building with odor control scrubbers installed on all vents. The entire WRP is surrounded by an aesthetic, 6 foot tall chain link fence or concrete block wall. The influent lift station will also be provided with covers and odor control.

The WRP meets the required setback requirements by providing 350 feet setback (three sides) and waiver (one side), for the full build-out WRP design capacity of 4.0 MGD.

The WRP is designed to meet the treatment performance criteria for new facilities as specified in A.A.C. R18-9-B204.

Site specific BADCT was not included as part of the BADCT demonstration for the WRP design which is designed to meet prescriptive BADCT as defined by A.A.C. R18-9-B204. Prescriptive BADCT meets AWQS for all parameters listed in A.A.C. R18-11-406(B) through (E). This excludes AWQS listed for pathogens in A.A.C. R18-11-F. The single sample maximum pathogen BADCT limit for large facilities is 23 cfu/100 ml and for small facilities is 800 cfu/100 ml.

The size, number, and proposed operation of the subsurface recharge facility, injection wells, and vadose zone wells used site specific data for soil type and infiltration rates as part of the BADCT demonstration. Based on the site geology, approximately one mile of subsurface disposal leach trenches, 12 vadose wells and/or 4 aquifer injection wells may be needed to infiltrate all 4.0 MGD effluent into the subsurface. The specific BADCT designs for each proposed recharge method are identified below.

Subsurface Recharge Facility: The subsurface recharge facility will be constructed in four phases of approximately 0.25 miles each. Each phase will consist of six parallel trenches constructed a minimum of two feet below the active channel of ephemeral Queen Creek. Each trench will be approximately 1100 feet long and consist of 3-foot wide trenches spaced 20 feet apart with 4-inch diameter perforated pipe placed in the center. Each trench will be set at a slope of ~0.003 feet/foot. Half the trench length (1<sup>st</sup> 550') will consist of 8" perforated pipe designed to convey 1 MGD of effluent. The last 550' will consist of 6" perforated pipe to convey 0.5 MGD. The perforated pipe will be laid over one foot of washed gravel with

another one foot of washed gravel cover. The trenches will be covered with geotextile fabric to protect against soil infiltration.

Aquifer Injection wells: Each injection well, if installed, may be equipped with a water level transducer, a down hole flow control valve and a submersible pump for back flushing and/or recovery. Injection rates are predicted to be variable ranging from 50 gpm to ~700 gpm. The projected build-out would likely be 4 injection wells, if the recharge capacity per well is 700 gpm, giving the facility an approximate recharge capacity of 2800 gpm or 4.0 MGD. The final type and number of wells will be based on the recharge capacity of the initial wells constructed at the site.

Vadose Zone Wells: Each vadose zone well, if installed, will be constructed to a depth of approximately 180 feet. Recharge rates are anticipated to be between 250-300 gpm per vadose well. The actual recharge rates will depend on site and time-specific conditions, including geological conditions, the availability of water, and the amount of well plugging that occurs. A filtration system utilizing a 10 micron screen will be used to filter effluent, removing 96% of the suspended solids to prolong the recharge capacity and longevity of the wells.

### **III.COMPLIANCE WITH AQUIFER WATER QUALITY STANDARDS**

#### **Monitoring and Reporting Requirements**

The Pecan Wastewater Reclamation Plant (WRP) is located over alluvium in East Salt River Valley Basin within the Basin and Range Physiographic Province which is defined by uplifted blocks or mountain ranges with intervening alluvial basins or valleys, created by extensional (pull apart) faulting. The elongated basins and ranges typically trend northwest-southeast and parallel one another. The basin is bounded on the south-southwest by the Santan Mountains and the north-northwestern boundary is defined by the Utery and Goldfield Mountains. Alluvium filling the basin is typically subdivided into the Upper Alluvial Unit, Middle Alluvial Unit and the Lower Alluvial Unit. The Upper and Lower Alluvial Units typically consist of silt, sand and gravel whereas the Middle Alluvial Unit consists mainly of clay, silt, mudstone, and gypsiferous mudstone with interbedded sand and gravel.

Two percolation tests (one in each basin) were performed on 6/7/04 within the proposed recharge basins. The tests identified soils as silty sand to sandy silt with some clay. The percolation rate for these tests was 9 minutes/inch and 4 minutes/inch, respectively.

Test borings/percolation tests were performed at eight locations along the length of the subsurface disposal facility on April 9 and 10, 2007. Percolation tests were conducted at depths of 4, 8, and 11 feet, respectively. In general the site surface and near-surface soils consisted of silty sand containing some gravel from the surface and extending from 2 to 7 feet in depth. These soils were loose to medium dense, had non-plastic to low plasticity fines and were interbedded with clayey sand and sandy clay. Underlying these soils to the bottom of the borings was clayey sand to sandy clay containing trace to some gravel. These soils were

medium dense to dense (clayey sand), firm to stiff (sandy clay), had medium to high plasticity and were interbedded with sandy silty clay. These soils were underlain by silty sandy soils which were described as very moist to wet at boring sites located adjacent to the standing water located at the western end of the project site. The percolation test results ranged from 4.3 to 120 mpi with an average value of 14.7 mpi.

The WRP is also in the East Salt River Valley groundwater sub-basin of the Phoenix Active Management Area within the Middle Gila River Watershed. Groundwater is present in the alluvial units beneath the facility. Historically, the groundwater was probably flowing, westerly in alignment with Queen Creek beneath the facility. However, the area has experienced extensive groundwater pumping altering the groundwater flow direction. It is believed that groundwater is now flowing northwesterly at a depth of about 350 feet below the land surface although a southwesterly groundwater flow direction is possible due to the influence of localized groundwater pumping.

The area is experiencing subsidence and fissuring due to groundwater withdrawal as documented by Pinal County. The estimated subsidence near the WRP ranges between 0 and 3.1 feet. The nearest known fissures are located approximately 3.5 miles southwest of the WRP, near the northern corner of the Santan Mountains, trending northeast-southwest adjacent to the west side and east-west along the north side of the Hunt Highway. The WRP has been designed and sited to reduce differential settlement from subsidence.

The permittee is required to show that pollutants discharged will not cause or contribute to a violation of aquifer water quality standards at the POC. The location of the points of compliance (POCs) which show compliance with aquifer water quality standards is determined by an analysis of the pollutant management area (PMA), the discharge impact area (DIA), and locations and uses of groundwater wells in the area. The POC locations are selected to protect off-site uses of groundwater, to verify BADCT performance, and to allow early detection of potential impact from the WRP discharges.

The pollutant management area (PMA) is described in A.R.S. §49-244 as the limit projected in the horizontal plane of the area on which pollutants are or will be placed. The PMA includes horizontal space taken up by any liner, dike or other barrier designed to contain pollutants in the facility. If the facility contains more than one discharging activity, the PMA is described by an imaginary line circumscribing the several discharging activities. The PMA for this facility is defined by a line circumscribing the WRP, the proposed direct injection and vadose recharge wells, and the approximately one mile long subsurface disposal field within Queen Creek Wash. The PMA within the channelized portion of Queen Creek Wash between Gantzel and Kenworthy Roads is approximately 120 feet wide and one mile long. This portion of the PMA is adjacent to the parcel containing the WRP and proposed recharge wells located on the southern bank of Queen Creek near Gantzel Road. (western end of the PMA). The portion of the PMA containing the WRP and proposed recharge wells is approximately 650 feet wide by 700 feet long.

The discharge impact area (DIA) is defined by A.R.S. §49-201.13. The DIA means the potential areal extent of pollutant migration, as projected on the land surface, as the result of a

discharge from a facility. The DIA analysis typically evaluates the distance a particle of a “pollutant” may travel in a specified timeframe (typically 20 years) from the point of recharge. In the event that effluent meets AWQS at the point of discharge from the WRP, the “pollutant” is defined as a particle of “water”. The discharge impact area analysis indicates that a particle could move up to 12,493 feet (2.37 miles) during the 20-year time frame.

A groundwater mound or Area of Impact (AOI) measures the changes in water levels due to the recharge with the extent generally defined by a rise in the water table of one foot or more. Changes in water level may or may not be similar to the distance a particle [of a pollutant] may travel depending on site conditions. The Area of Impact (AOI) was determined analytically using the computer program THWells for the ADWR recharge permit application. The AOI was used to estimate the maximum increase in water levels if recharge were to occur continuously for 20 years at the maximum disposal capacity for this WRP. The model estimates at the end of the 20-year modeled period that the overall rise in the groundwater level will be 54 feet and the one-foot rise has an ~11 mile radius if all 4.0 MGD of effluent are recharged.

Fourteen wells are located within 0.5 miles of the WRP and recharge sites. Ten of the wells located within 0.5 miles are used for domestic drinking water sources, 3 for irrigation, and the on-site well is used for non-potable (industrial) water uses at the WRP although it is listed as an exempt domestic well with ADWR. The nearest off-site domestic well is located approximately 500 feet west-southwest of the proposed location of an aquifer injection well near the southwest corner of the Pecan Orchard site.

Discharge monitoring is required for Reclaimed Water Class A+ for which the WRP is classified. Nitrogen, coliform metals and Volatile Organic Compounds (VOCs) discharge monitoring tables are also included in the permit. Groundwater will be monitored for similar parameters. AQLs for nitrates in groundwater have not been established at this time. AQLs will be established once the facility submits the information in Section 3.4. Only one round of sampling has been requested, as the permittee has already submitted the ambient water quality data from the surrounding wells. This data showed no exceedance of the AWQS. However due the proximity of Queen Creek, and past land use, the same may not be true for the new POC well. Therefore the facility is being asked to submit one round of sampling from the new POC well to confirm that the ambient water quality meets the AWQS. If it does not, then the facility will have to drill an up-gradient well to determine ambient conditions as required in Section 3.4

Due to the depth of groundwater being 350 feet, and the facility producing tertiary treated denitrified effluent, and groundwater monitoring required at the point of compliance well (POC), the facility is expected to meet the AWQS at the POC.

### **Point of Compliance (POC)**

Two hazardous/non-hazardous POCs have been designated for this facility as follows:

| POC # | Descriptive Location  | Latitude           | Longitude           |
|-------|---|--------------------|---------------------|
| 1     | designated at the northwest corner of the WRP site  | 33°13'49.585"<br>N | 111°33'46.160"<br>W |
| 2     | designated approximately 275' downstream (west) of the AZPDES outfall within Queen Creek Wash and 130' north of the POC #1. | 33°13'51.059"<br>N | 111°33'46.121"<br>W |

The June 1, 2005 Significant Amendment (and 11/20/06 Other Amendment) required that the existing on-site non-potable well be converted into a monitor well (MW #1). The permit compliance schedule required notification be sent to ADEQ within 15-days of the conversion but did not specify a specific timeframe for completion of this compliance item. This conversion required perforating the existing blank casing at the appropriate interval near the water table (generally 20 feet above and 40 feet below the water table). This on-site well is located on the northeastern edge of the WRP site, downgradient of the recharge basins and within the area of impact determined for the proposed recharge wells. However, this well has not been converted to a monitor well and the latest amendment application requests that it be deleted from the permit as a POC well. Instead a monitor well will be installed downstream of the AZPDES outfall at the newly designated location for POC #2. This new well is required to be installed within 30 days of issuance of the permit. A monitor well is not required to be installed at POC #1 except as a contingency action. The design of this well, if required to be installed, will be similar to POC #2.

The Director may designate additional points of compliance if information on groundwater gradients or groundwater usage indicates the need.

#### Monitoring and Reporting Requirements

Effluent and groundwater monitoring are required to ensure that the site operations do not negatively impact the groundwater; the facility will be required to meet the AWQS in the discharge. Effluent will be monitored at the effluent pump station prior to discharge for reuse at the agronomic rate or recharge via the subsurface recharge facility, vadose zone recharge wells and/or aquifer injection recharge wells. Groundwater will be monitored at a new monitor well to be installed at POC #2, downgradient (west) of the subsurface recharge facility, within 30 days of issuance of the permit.

| Sampling Point Number | Descriptive Location  | Latitude        | Longitude        |
|-----------------------|-----------------------|-----------------|------------------|
| 1                     | Effluent pump station | 33°13'46.883" N | 111°33'45.096" W |
| 2                     | POC #2                | 33°13'51.059" N | 111°33'46.121" W |

| Parameter | Effluent / Recharge                       | Reuse                                     | Groundwater |
|-----------|---|---|-------------|
| Flow      | daily;<br>calculate<br>monthly<br>average | daily;<br>calculate<br>monthly<br>average |             |

| Parameter  | Effluent / Recharge | Reuse   | Groundwater   |
|--|---------------------|---------|---------------|
| pathogens:<br>Effluent: fecal coliform<br>Reuse: fecal coliform<br>Groundwater: total coliform                       | monthly             | daily   | monthly       |
| nutrients:<br>Effluent: total nitrogen<br>Reuse: total nitrogen<br>Groundwater: nitrate-nitrite, TKN, total nitrogen | monthly             | monthly | monthly       |
| inorganic chemicals: metals, cyanide, fluoride as listed in A.A. C R18-11-406.B                                      | quarterly           |         | quarterly     |
| VOCs and semi-VOCs per A.A.C. R-18-11-406.C  | semi-annually       |         | semi-annually |

In addition, the permittee will be required to install the following BADCT Observation Wells within the subsurface disposal facility.

| Sampling Point Number | Descriptive Location      | Latitude       | Longitude        |
|-----------------------|---------------------------|----------------|------------------|
| 3                     | BADCT Observation Well 1A | 33°13'54.546 N | 111°33'38.835" W |
| 4                     | BADCT Observation Well 1B | 33°13'54.348 N | 111°33'38.821" W |
| 5                     | BADCT Observation Well 1C | 33°13'54.151 N | 111°33'38.806" W |
| 6                     | BADCT Observation Well 1D | 33°13'53.953 N | 111°33'38.792" W |
| 7                     | BADCT Observation Well 1E | 33°13'53.756 N | 111°33'38.777" W |
| 8                     | BADCT Observation Well 1F | 33°13'53.558 N | 111°33'38.763" W |
| 9                     | BADCT Observation Well 2  | 33°13'55.232 N | 111°33'25.831" W |
| 10                    | BADCT Observation Well 3  | 33°13'56.578 N | 111°33'12.916" W |
| 11                    | BADCT Observation Well 4  | 33°13'58.320 N | 111°33'00.064" W |

| BADCT Observation Well   | Performance Levels  | Inspection Frequency |
|--|---|----------------------|
| Water elevation in subsurface disposal facility observation wells, except during flooding of wash. | Less than top of recharge trench or 12" above the perforated recharge pipe. | Daily                |
| During flooding of wash  | Identify periods of flooding and sources of "flooding".                     | Daily                |

If a performance level is exceeded implementation of a specific contingency action will be required in accordance with the permit (Section 2.6.2 – Exceeding of a performance level). This section defines the following contingency actions relating to operation of the subsurface recharge facility.

| Conditions | Action |
|------------|--------|
|------------|--------|

|   | <b>Conditions</b>   | <b>Action</b>   |
|---|---|---|
| 1 | Performance level exceeded in one or more effluent disposal lines of Phase I of the Recharge Facility.              | Reduce flow to specific disposal line and/or reduce flow to Phase I and/or construct additional phase/s.  |
| 2 | Performance level monitoring shows Phase I has reached disposal capacity with discharges to all six disposal lines. | Construct and operate additional phases II through IV.  |
| 3 | Performance level shows all phases and disposal lines of the Recharge Facility are at capacity.                     | Obtain a significant amendment proposing to construct additional recharge lines to each phase and/or construct permitted vadose zone or direct injection wells. |

The facility is located in an area of subsidence and potential fissuring, therefore, it is recommended, that the facility inspections check for effects of subsidence and fissuring on the facility structures.

#### **IV. STORM WATER and SURFACE WATER CONSIDERATIONS**

Storm water / surface water considerations included whether the facility was located within the 100-year flood plain and whether the discharge had the potential to impact the adjacent surface water drainage.

The facility is located immediately south of ephemeral Queen Creek, a tributary to the Gila River located in the Middle Gila surface water basin. Queen Creek generally flows in a westerly direction near the facility only in response to rainfall events. Portions of the WRP are located within the 100-year flood plain for the creek, but are bermed for protection from flooding. The proposed direct injection and vadose zone wells will also be protected from flooding. The Pecan WRP has been approved by the Pinal County Flood Control Office for operating inside the 100-year floodplain.

The proposed subsurface recharge disposal facility is located within the 100-year flood plain and the active channel for Queen Creek. The portion of Queen Creek (between Gantzel and Kenworthy Roads) proposed for the subsurface leach field has been partially excavated by a gravel operation. The current channel is between approximately 18 and 38 feet below the natural channel based on the unexcavated stream bed west of Gantzel Road and east of Kenworthy Road. As such, surface water flow from storm events and other sources (i.e., irrigation return flow) will potentially pond in the area rather than flow downstream.

However, the facility will be buried a minimum of two feet beneath the surface of the active channel of Queen Creek (Depth varies between 2 and 14 feet based on existing channel elevation and slope of piping.). The facility will be designed, operated and maintained to prevent discharges of effluent to the surface which is not allowed per Pinal County requirements.

Queen Creek has designated surface water quality uses of ephemeral Aquatic and Wildlife (A&W<sub>e</sub>) and partial body contact (PBC). Monitoring of nearby drainages was not originally

included as a permit condition because the facility did not discharge to any surface water. With approval of the subsurface disposal field beneath the active channel of Queen Creek, BADCT monitoring of observation wells located in the subsurface disposal field will be required with this amendment to ensure that effluent from the disposal field will not surface in violation of Pinal County requirements. Surface water quality and discharges will be regulated in accordance with the valid AZPDES Permit No. AZ0025445.

## **V. COMPLIANCE SCHEDULE**

| <b>Description</b>   | <b>Deadline</b>   |
|--|---|
| <b>STATUS REPORTS</b>  |   |
| Submit a report by January 30 of the next year for the previous year indicating the actual flow through WRP for the last month of previous year and number of phases in operation by the end of that year. This report shall identify total flows through the WRP, total reuse capacity, and total recharge capacity. This report may also propose construction of additional WRP phases, subsurface recharge facility phases II, III and IV, if not already completed, vadose zone wells, or direct injection wells. This report shall be submitted yearly till all phases of the WRP, all phases of the subsurface recharge facility, all permitted vadose zone wells, and all permitted direct injection wells are constructed. | Annually by January 30 <sup>th</sup> .  |
| <b>WASTEWATER RECLAMATION PLANT – PHASED CONSTRUCTION</b>  |   |
| Notify ADEQ of the start-up and completion of construction of Phases 3 or 4 of the WRP.  | Within 15 days of start up.   |
| Submit an Engineer’s Certificate of Completion for Phases 3 or 4 of the WRP.   | Prior to commencing operation of Phases 3 or 4.                                     |
| Notify ADEQ upon commencing operation of the completed Phase 3 or 4 of the WRP. The facility shall increase flows from 2.0 MGD to 3.0 or 4.0 MGD only upon the construction of additional treatment and disposal phases and only after notifying ADEQ by certified mail that additional treatment and disposal phases have been constructed.   | Within 15 days of commencing operation.   |
| Upon completion of all WRP phases the facility may request an “other” amendment to delete the monitoring Tables in section 4.0 that are no longer applicable.  | Within 90 days of completion of construction of all WRP Phases.                     |
| <b>POC MONITORING WELL</b>   |   |
| Install monitoring well at POC #2.   | Within 30 days of issuance of the permit.   |
| The permittee shall begin sampling groundwater for the parameters listed in Section 4.0, Table II.   | Within 7 days after monitor well completion.  |
| Submit a Well Installation Report to ADEQ for review. This report shall include the ADWR well completion records, drillers’ logs, actual latitude and longitude, results of testing, and an “other” amendment request to establish AQLs, as applicable, in Table II or a proposed upgradient monitoring well location.   | Within 30 days after receiving results of the initial sampling event at the POC #2. |
| <b>UPGRADIENT MONITORING WELL</b>  |   |



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| <b>Description</b>   | <b>Deadline</b>  |
|--|--|
| If any AWQS are exceeded in the initial groundwater sample collected from POC #2, an upgradient well, outside of the zone of influence of the recharge should be installed to determine existing groundwater conditions.   | Determination based on initial sample collected from POC #2.   |
| If an upgradient groundwater monitoring well is required based on the initial groundwater quality sampling data from POC #2, the applicant shall propose a location and well design.   | Within 30 days after receiving notification of the initial sampling event at the POC #2.                             |
| Install upgradient monitor well  | Within 90 days after receipt of ADEQ's written approval of the well design and location from ADEQ.                   |
| Submit a Well Installation Report to ADEQ.   | Within 30 days after monitor well completion.  |
| The permittee shall begin conducting 8 monthly rounds of ambient groundwater quality sampling for the parameters listed in Section 4.0, Table II.  | Within 30 days after monitor well completion.  |
| The permittee shall submit an Ambient Groundwater Monitoring Report to the Water Permits Section. The permittee may propose ALs and AQLs based on statistical evaluation of all eight rounds of groundwater data collected.  | Within one year after collection of ambient groundwater quality data.  |
| <b>POC LOCATIONS AND GROUNDWATER FLOW DIRECTION EVALUATION</b>   |  |
| Assess groundwater flow conditions, recharge and groundwater monitoring to evaluate the adequacy of POC locations, identify data gaps, if any, and propose wells as needed to satisfy data gaps. Include an updated water level elevation map with the assessment based on data from wells located within one mile of the recharge facilities.                   | Annually   |
| <b>SUBSURFACE RECHARGE FACILITY</b>  |  |
| Notify ADEQ of completion of construction of Phases I, II, III and/or IV of the disposal facility including the installation of BADCT Observation Ports.   | Within 15 days of completion of each phase.  |
| Test at least one ¼ mile leach disposal trench in Phase I to determine the recharge rate for a period of not less than 2 weeks.  | Within 90 days of completion of Phase I.   |
| Submit report to ADEQ documenting the results of testing and determination of the recharge rates and capacity. This report may propose construction of additional subsurface recharge facilities (Phases II through IV), if not already constructed.   | Within 30 days after test completion.  |
| <b>VADOSE ZONE RECHARGE WELLS</b>  |  |
| Notify ADEQ in writing of the installation and testing of each vadose zone recharge well.  | Within 15 days of installation.  |
| Submit a Well Installation Report to ADEQ for review. Include the well driller's logs and results of testing necessary to determine the available recharge rates and a map showing location of the well(s) installed, including the latitudes and longitudes for each well. The report will indicate if additional permitted vadose zone wells will be required. | Within 60 days after installation and completion of recharge testing.  |
| Construct additional permitted vadose zone recharge wells.   | When actual flows exceed 80% of existing well capacity or earlier based on Well Installation Report submitted above. |
| <b>DIRECT AQUIFER INJECTION RECHARGE WELLS</b>   |  |

| <b>Description</b>   | <b>Deadline</b>  |
|--|--|
| Notify ADEQ in writing of the installation and testing of each direct aquifer injection recharge well.   | Within 15 days of installation.  |
| Submit a Well Installation Report to ADEQ for review. Include the well driller's logs and results of testing necessary to determine the available recharge rates and a map showing location of the well(s) installed, including the latitudes and longitudes for each well. The report will indicate if additional permitted direct aquifer injection recharge wells will be required. | Within 60 days after installation and completion of recharge testing.  |
| Construct additional permitted direct aquifer injection recharge wells.  | When actual flows exceed 80% of existing well capacity or earlier based on Well Installation Report submitted above. |

## **VI. OTHER REQUIREMENTS FOR ISSUING THIS PERMIT**

### **Technical Capability**

Johnson Utilities, L.L.C. has demonstrated the technical competence necessary to carry out the terms and conditions of the permit in accordance with A.R.S. § 49-243(N) and A.A.C. R18-9-A202(B).

The WRP was designed as per the design report prepared and stamped, dated, and signed (sealed) by Terry L. Moore, P.E. (Professional Engineer), Moore and Associates, Inc., dated September 26, 2003, and subsequent sealed submittals that served as additions to the design report. The design was finalized as per the design report prepared and stamped, dated, and signed (sealed) by Gregory H. Brown, P.E., Specific Engineering, LLC., dated January 13, 2005, and subsequent sealed submittals that served as additions to the design report.

The permit requires that appropriate documents be sealed by an Arizona registered geologist or professional engineer. This requirement is a part of an on-going demonstration of technical capability. The permittee is expected to maintain technical capability throughout the life of the facility.

### **Financial Capability**

Johnson Utilities, LLC has demonstrated the financial responsibility necessary to carry out the terms and conditions of the permit in accordance with A.R.S. § 49-243(N) and A.A.C. R18-9-A203. The National Bank of Arizona provided an Irrevocable Standby Letter of Credit to Johnson Utilities, LLC to operate, maintain, and if necessary, close the WRP. The permittee is expected to maintain financial capability throughout the life of the facility.

### **Zoning Requirements**

The WRP has been properly zoned for the permitted use and the permittee has complied with all Pinal County zoning ordinances in accordance with A.R.S. § 49-243(O) and A.A.C. R18-9-A201(A)(2)(c).

## **VII. ADMINISTRATIVE INFORMATION**

### **Public Notice (A.A.C. R18-9-108(A))**

The public notice is the vehicle for informing all interested parties and members of the general public of the contents of a draft permit or other significant action with respect to a permit or application. The basic intent of this requirement is to ensure that all interested parties have an opportunity to comment on significant actions of the permitting agency with respect to a permit application or permit. This permit will be public noticed in a local newspaper after a pre-notice review by the applicant and other affected agencies.

### **Public Comment Period (A.A.C. R18-9-109(A))**

The aquifer protection program rules require that permits be public noticed in a newspaper of general circulation within the area affected by the facility or activity and provide a minimum of 30 calendar days for interested parties to respond in writing to ADEQ. After the closing of the public comment period, ADEQ is required to respond to all significant comments at the time a final permit decision is reached or at the same time a final permit is actually issued.

### **Public Hearing (A.A.C R18-9-109(B))**

A public hearing may be requested in writing by any interested party. The request should state the nature of the issues proposed to be raised during the hearing. A public hearing will be held if the Director determines there is a significant amount of interest expressed during the 30-day public comment period, or if significant new issues arise that were not considered during the permitting process.

## **VIII. ADDITIONAL INFORMATION**

Additional information relating to this permit may be obtained from:

Arizona Department of Environmental Quality  
Water Quality Division - Wastewater APP and Reuse Unit, Attn: Asif Majeed  
1110 West Washington Street, Mail Code 5415B-3  
Phoenix, Arizona 85007  
Phone: (602) 771-4683